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## Increasing Retention of Females in STEM Careers

### Objective

- Research ways to familiarize engineering students with the safety and usage of common engineering equipment
- Determine the reason why women have left the engineering program and why current females intend to stay
- Suggest to the engineering departments ways to keep retention of women high within the College of Engineering

### Introduction

This project is intended to bring awareness to the lack of retention of women in the engineering discipline. Based on research, women are more likely not to complete an education in the engineering field. If they do complete their engineering education, they are more likely to change their career path later in life. Retention seems to be higher when a more hands on experience occurs early in the engineering curriculum.<sup>1</sup>

#### General Statistics

- 1 in 18 workers in the US are employed, in science, technology, engineering, or mathematics (STEM)<sup>2</sup>
- 20% of all US jobs require a high level of STEM knowledge<sup>2</sup>
- In 2013, women accounted for 55% of the university graduates ages 25 to 29 but only 31% of the STEM graduates<sup>1</sup>
- In an industrial setting women account for 50% of the overall US workforce but only account for 25% of STEM workers<sup>1</sup>

Some reasons why the number of women in the STEM field is so low could include peer pressure, lack of role models, and misperception of what STEM careers look like in the real world.<sup>1</sup>

### Materials and Methods

To see the views of women in engineering at Iowa State University (ISU) a survey was conducted. The analysis consisted of asking 40 females in engineering majors 5 questions about their experience at ISU. These anonymous electronic surveys were conducted from women in all engineering disciplines at ISU. Pie graphs were formed to visually interpret the results.

In addition to the surveys, interviews were conducted with students and faculty to better understand their views on women in engineering.

### Results

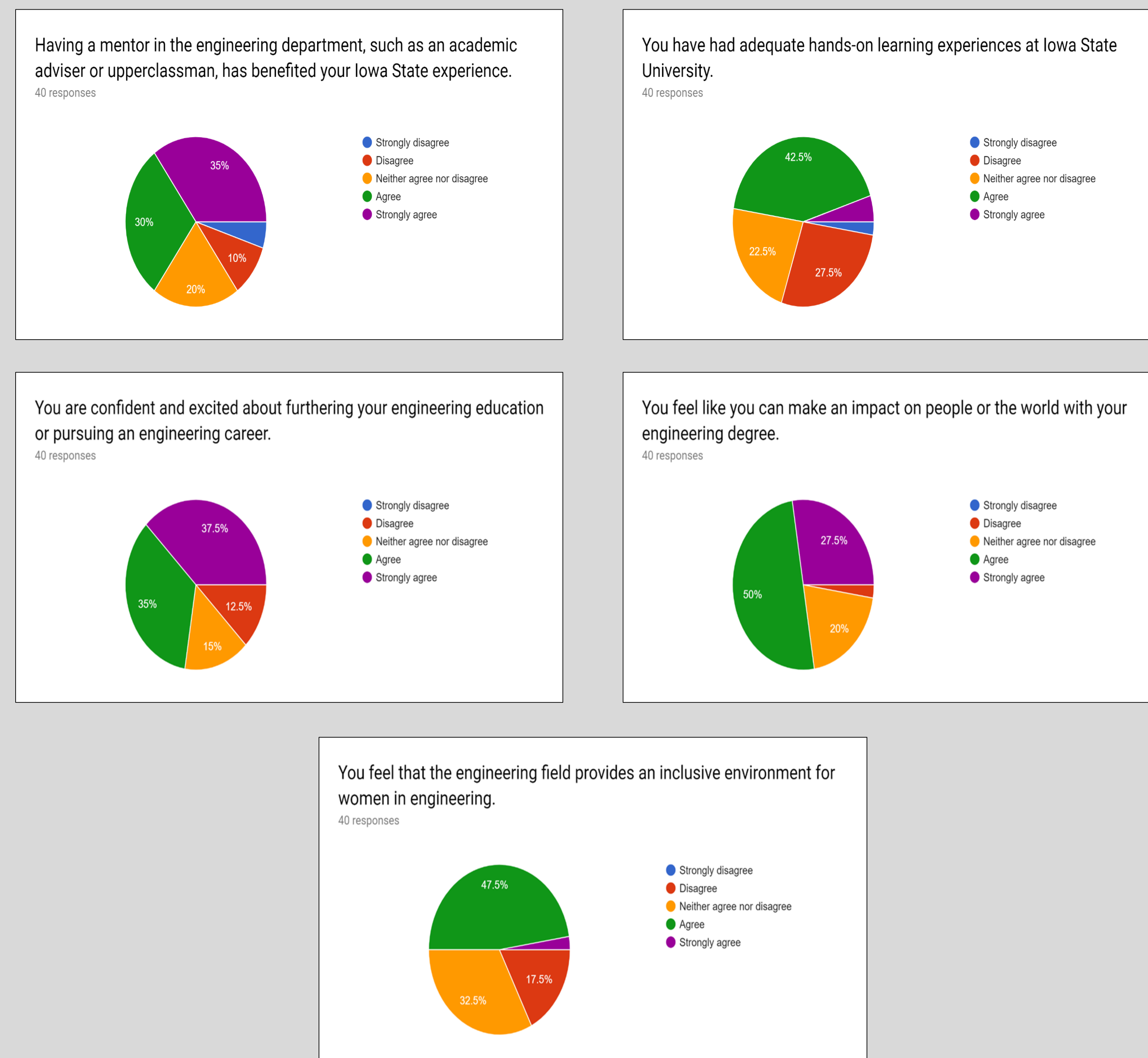


Figure 1: Student responses to the effectiveness of the engineering curriculum and personal view points on engineering

### Key Findings

- Students found that having a mentor within the engineering department, such as a faculty or upperclassmen, helped them confidently pursue a career within engineering.
- Half of the women surveyed indicated their education provided a sufficient amount of hands on learning experiences, while the other half indicated there was not enough hands on learning experience within their curriculum.
- Most women found that they were excited to pursue their engineering career path and could make an impact on the world with their undergraduate degree.
- From the individuals interviewed, the people who chose a different career path from engineering indicated the main reason why they switched paths was they were not passionate for the engineering field

### Future Investigation

- Further research should be done to look into each individual engineering department at Iowa State University. The surveys conducted in this research were done anonymously and did not analyze each department independently.
- With passion being one of the biggest factors for the satisfaction of women engineers, departments could look into tailoring introductory courses to help students find what industry within engineering best suits them.
- Further research could be done to see if there is a better way to set up mentors for women in engineering, or help women become more aware of how to obtain a mentor within their department.
- Further investigation could be done to allow students to tour different facilities around campus, like the Boyd Lab, to allow students, specifically women, to see in person different applications for their major.



### Conclusion

This project allowed for the investigation into why a significant number of women do not stay within the engineering field. It was valuable to look into this topic to see if at a college level there is anything that can be done to retain women in engineering before they enter the workplace. Again, some of the reasons women may leave the engineering field is the lack of mentors and misperceptions about STEM fields. From the surveys conducted it was shown that the current women in engineering at Iowa State University found value in mentors. It was also found that there could be more hands on learning experiences offered, which could potentially give women more guidance and combat any misperceptions about the engineering workplace. According to surveys, most women interviewed are confident about their decision with pursuing engineering. However, during interviews this was one of the reasons why people left the field, because they were not passionate about the engineering field. With engineering being a diverse field, it is important that women find what they are interested in early within their education to allow for a better chance at retaining women in STEM fields.

### References

- [1] C. Corbett, Solving the Equation: The Variables for Women's Success in Engineering and Computing, Washington DC: AAUW, 2015.
- [2] A.Stansbury, "Women and STEM occupations: Retention rates and reasons for leaving," *Journalist's Resource*, 2013.